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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/529,227  
Filing Date: March 25, 2005  
Appellant(s): HARRIS ET AL.

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Stanley Spooner  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed May 5<sup>th</sup>, 2008 appealing from the Office action mailed October 16<sup>th</sup>, 2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

6,383,451	KIM	5-2002
4,780,664	ANSUINI	10-1998
EP0932037 A2	KORDECKI	7-1999
5,338,432	AGARWALA	8-1994
5,437,773	GLASS	8-1995
5,409,859	GLASS	4-1995

**(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

**Claims 1-7** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim (6,383,451) in view of Ansuini (4,780,664).

Kim discloses an electric resistance sensor for measuring corrosion rate. Kim discloses an electric resistance sensor, which includes a plurality of corrosive tracks 41 (substantially constant width across; lines 40-56, col. 2, fig. 1) between two common terminals 50 (corrosion-protected) on each side, on a substrate 20 (lines 25-67, col. 2, fig. 1; lines 1-5, col. 3). Kim also discloses that as each corrosive track is exposed to the corrosive environment is corroded and the resistance values are resultantly varied. Kim further discloses that as a result the resistance value of the electric resistance sensor 10 is varied, and such a variation of the resistance value may be measured by the current variation when the predetermined voltage is applied to the connecting units 30, 31 (lines 1-24, col. 4). Kim also discloses that when the predetermined current is applied to the connecting units, the variation of the resistance value can be measured

by the voltage variation (lines 1-24, col. 4). Kim also discloses that the metal thin film 21 is deposited by one of several process, such as sputtering (lines 16-60, col. 3).

Kim does not disclose each bend has a minimum radius of curvature, which is greater than half the average width of the corrosive tracks.

Ansuini discloses corrosive tracks in a serpentine formation which have a radius of curvature greater than half the average width of the corrosive tracks. Ansuini further discloses that the serpentine configuration is for space-saving purposes (lines 51-66, col. 4, figs. 1&2).

It would have been obvious to modify the Kim device to include bends with a minimum radius of curvature which is greater than half the average width of the corrosive tracks such as taught by Ansuini in order to provide a corrosive track configuration which saves space. Further, with regard to claim 1, if the Kim device is taken to not have a plurality of mutually inverted generally U-shaped bends, it would have been obvious to modify the Kim device to include such a configuration with the plural tracks of Kim, such as taught by Ansuini, in order to save space.

**Claims 8-10** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini as applied to claims 1-7 and in further view of Kordecki (EP0932037 A2).

Kim/Ansuini does not disclose a reference sensor that provides a measurable variation in resistivity in response to changes in temperature, which takes the same

form as the resistivity sensor and is arranged in an overlapping manner to the resistivity sensor.

Kordecki discloses that conventional corrosion sensors include a temperature reference in conjunction with the sensor for performing temperature correction of any changes in the measured resistance, and that these sensors often come in the arrangement of a Wheatstone bridge or Kelvin bridge (paragraphs 0003-0004).

It would have been obvious to modify the Kim/Ansuini device to include a reference sensor in the corrosion sensor device to provide a measurable variation in resistivity in response to temperatures changes such as taught by Kordecki in order to provide for temperature corrections of any changes in the measures resistance so as to yield proper results.

**Claims 11 and 12** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini as applied to claims 1-7 and in further view of Agarwala (5,338,432).

Kim/Ansuini does not disclose a galvanic sensor with at least one corrosive track made of a first metallic material and a thin film track made of a second, different, metallic material. Kim also does not disclose corrosive tracks with further tracks arranged in an interdigitated pattern.

Agarwala discloses corrosivity sensors, which have conductive elements 16a and 16b with strips 24a and 24b, as shown in fig. 1a-b. Agarwala also discloses that the conductive elements 16a and 16b may be of dissimilar metals so that one element may

act as an anode and the other as an anode so that the presence of an electrolyte will generate galvanic current (lines 53-63, col. 3; lines 4-11, col. 4). Agarwala also discloses that the magnitude of the galvanic current will be indicative of the corrosivity of the electrolyte or environment (lines 56-58, col. 3). Agarwala also discloses that the strips 24a and 24b of elements 16a and 16b are interdigitated so that the strips alternate between those of one conductive element and those of the other, and the strips 24a and 24b may form any interdigitated pattern (lines 12-22, col. 3).

It would have been obvious to modify the Kim/Ansuini device to include a galvanic sensor of different metal tracks and an interdigitated pattern of corrosive tracks such as taught by Agarwala in order to provide another means for determining the corrosivity of the electrolyte or environment and to form a pattern of conductive elements and resistive elements.

**Claims 13-15** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini as applied to claims 1-7 and in further view of Glass (5,437,773).

Kim/Ansuini does not disclose a platinum resistance thermometer for measuring a temperature where the microsensor is mounted. Kim also does not disclose that the corrosive tracks are made of a metallic alloy or an aluminum alloy.

Glass ('773) discloses a method for monitoring corrosion that includes a resistance-temperature detector (RTD), which typically would be a platinum thin film or line of any dimension. Glass ('773) discloses that the RTD will be used for temperature correction and will be incorporated as part of the array (lines 21-35, col. 12). Glass



('773) also discloses that as illustrated in fig. 2, aluminum alloys such as 2024 and 7075 are used as corrosion potential rate sensors 15 and 16 (lines 11-32, col. 5). Glass ('773) also discloses that the corrosion monitor apparatus may be applied to an aircraft (lines 24-28, col. 5). Glass ('773) also discloses that sputtering is used for deposition of the sensor materials (lines 40-42, col. 9).

It would have been obvious to modify the Kim/Ansuini device to include a platinum resistance thermometer and aluminum alloy sensor elements with additional application to an aircraft such as taught by Glass ('773) in order to provide temperature correction means for measurements indicating changing conditions and a proper material for determining corrosion rates in changing environments, such as on aircrafts.

**Claims 16-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini and Glass ('773) as applied to claims 13-15 and in further view of Kordecki (EP0932937 A2).

Kim/Ansuini/Glass ('773) does not disclose that the apparatus comprises a metallic alloy that shares a metal with the alloy of the track. Kim/Ansuini/Glass ('773) also does not disclose a second metallic component composed of a metallic alloy and a second metallic microsensor with a metallic alloy track. Kim/Ansuini/Glass ('773) also does not disclose that the proportion of the alloying constituent in the track alloy is similar to the alloying constituent of the bulk alloy to within 3% or to within 1% of the total constituents of the bulk alloy.

Kordecki discloses a multi-purpose sensor with a conductive sensing element. Kordecki also discloses that the conductive sensing element may be formed from alloys

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of palladium or lead, palladium-gold, lead-bismuth, or lead-palladium. Kordecki also discloses an abrasion sensor 100 which includes a substrate 110, contact pads 120 and 130, and a conductor 140 (paragraph 0015, fig. 1). Kordecki also discloses that the conductor 140 is made from a bimetallic alloy of 1% to 99% palladium or a bimetallic alloy of 1% to 99% lead and is arranged on a substrate to form sensing element 160 (paragraph 0022-0023). Kordecki also discloses that the abrasion sensor is suitably made from a palladium-gold alloy of 5% to 95% palladium and a complementary percent of gold; the composition of the palladium-gold alloy of the abrasion sensor may be adjusted with its conductor 140 to meet custom criteria (paragraph 0022). Kordecki discloses that such bimetallic alloys will possess the highest resistivity and lowest TCR (Temperature Coefficient of Resistivity) that can be attained for the given alloy (paragraph 0022). Kordecki also discloses a corrosion sensor 200 and its corresponding conductor 240, and the above discussion on the abrasion sensor and its corresponding conductor is applicable except for in the chosen materials of construction (paragraphs 0024-0025). Kordecki discloses that the conductor 240 is made from a bimetallic alloy of 1% to 99% palladium or a bimetallic alloy of 1% to 99% lead and is arranged on a substrate to form sensing element 260 in a serpentine pattern (paragraphs 0026-0027). Kordecki also discloses that the corrosion sensor of a lead-palladium or lead-bismuth alloy of 5% to 95% lead and a complementary amount of palladium or bismuth is well-suited for corrosion sensors, and this percentage composition may be adjusted for its conductor 140 in order to achieve a certain resistivity and TCR (paragraph 0026).

Kordecki also discloses a combination sensor 300, which incorporates the ideas of the above description for the abrasion and corrosion sensor (paragraphs 0028-0029).

It would have been obvious to modify the modified Kim/Ansuini/Glass ('773) device to include the above elements taught by Kordecki in order to provide a multi-functional abrasion and corrosion sensor of the proper alloy compositions to achieve desirable resistivity and TCR. With regard to claim 20, these limitations are drawn to intended use of the apparatus and are not afforded any patentable weight.

**Claims 21 and 22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim in view of Ansuini and Glass ('773) as applied to claims 13-15 and in view of Glass (5,409,859).

Kim/Ansuini/Glass ('773) does not disclose sputtering and annealing the thin film on to the substrate to encourage metallic grain growth.

Glass ('859) discloses that the platinum layer may be annealed after it is deposited on the substrate, in which deposition of the platinum alloy may occur by sputtering (lines 20-22, 45-52, col. 6; and contents).

It would have been obvious to modify the modified Kim/Ansuini/Glass ('773) device to include sputtering and then annealing the sputtered film to the substrate such as taught by Glass ('859) in order to strengthen and provide durability to the film.

**(10) Response to Argument**

**A.** Appellant argues that the Examiner fails to demonstrate where Kim teaches "a plurality of corrosive tracks" where each track is comprised of a "thin film track following a path which includes a plurality of mutually inverted generally U-shaped bends".

The Examiner argues that within the rejection of claims 1-7 under 35 USC 103(a) over Kim in view of Ansuini, the Examiner has included the relevant recitation within the rejection. The Examiner recites, in part, "Further, with regard to claim 1, if the Kim device is taken to not have a plurality of mutually inverted generally U-shaped bends, it would have been obvious to modify the Kim device to include such a configuration with the plural tracks of Kim, such as taught by Ansuini, in order to save space."

**B.** Appellant argues that the Examiner fails to appreciate that Kim teaches away from Appellant's claimed "plurality of corrosive tracks" which comprise a "patterned conductive thin film track following a path which includes a plurality of mutually inverted generally U-shaped bends".

Appellant points to figures 1 and 5 and the accompanying descriptions in the Kim reference, in which Appellant thereby concludes that as Kim teaches a plurality of thin lines 41 which are straight lines, Kim thereby teaches that it is preferable to use straight lines and thus would lead one of ordinary skill in the art away from the claim 1 embodiment. Appellant argues that Kim teaches away from the claim 1 limitation of "bends".

The Examiner argues that figures 1 and 5, and their accompanying descriptions do not teach away from the usage of bends in the thin lines 41. The Examiner argues that there is no disclosure in Kim that precludes the use of alternative form for the thin lines 41 and there is no disclosure that points contrary to the usage of thin lines that are not straight, or more specially, "bends" as in claim 1. Further, even if the plurality of straight thin lines 41 of Kim are said to be of preferable form, this does not preclude one of ordinary skill in the art from recognizing an alternative form of the thin lines. More specifically, the Examiner argues that the modification of Kim by Ansuini to include the serpentine configuration (i.e. mutually inverted generally U-shaped bends) is an obvious modification of the form of the thin lines 41 that would be seen by one of ordinary skill in the art for the purpose of providing an alternative form that saves space, making a more compact sensor.

**C.** Appellant argues that the Examiner fails to demonstrate where Ansuini teaches "a plurality of corrosive tracks" where each track is comprised of a "thin film track following a path which includes a plurality of mutually inverted generally U-shaped bends".

The Examiner argues that, as discussed above, the modification of Kim in view of Ansuini does not rely on the teachings of Ansuini to include a plurality of corrosive tracks. The Examiner argues that, as discussed above in relevant part, "Further, with regard to claim 1, if the Kim device is taken to not have a plurality of mutually inverted generally U-shaped bends, it would have been obvious to modify the Kim device to

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include such a configuration **with the plural tracks of Kim**, such as taught by Ansuini, in order to save space.”(Emphasis added) Thereby, Kim discloses a plurality of tracks 41 between common terminals 50 and Ansuini discloses that if a serpentine configuration is utilized for the corrosive track between a pair of terminals, space is saved. Thereby, the Examiner asserts that the teaching of a plurality of tracks in Ansuini is not relied upon in the obviousness-type rejection of claim 1 with respect to Kim in view of Ansuini, as discussed above.

D. Appellant argues that the Examiner fails to appreciate that Ansuini teaches away from "a plurality of corrosive tracks" where each track is comprised of a "thin film track following a path which includes a plurality of mutually inverted generally U-shaped bends".

As discussed above in the Grounds of Rejection, as well as within item C of the Arguments, the rejection of claim as applied under 35 USC 103(a) in view of Kim and Ansuini, does not rely upon Ansuini teaching a plurality of corrosive tracks between two common terminals. Ansuini teaches that if one form a corrosive track connected between two common terminals in a serpentine fashion (i.e. mutually inverted generally U-shaped bends), then one may save space in forming the corrosive track. As such, it would have been obvious to one of ordinary skill in the art to apply the teaching of a serpentine-formed corrosive track between two common terminals to all of the tracks of Kim, which are formed between two common terminals, so as to save space for the entire device. Examiner argues that one of ordinary skill in the art would understand the

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principle of saving space that Ansuini has taught with regards to the serpentine-formed corrosive track, and would apply such a principle to each such case (i.e. to all individual tracks 41 of Kim) in order to maintain its space-saving advantage to the entirety of the device.

E. Appellant argues that the Examiner provides no basis for a rejection of claim 1 or any claims dependent thereon under 35 USC 103(a) as being unpatentable over Kim in view of Ansuini.

Appellant argues that because all claims in this application depend from claim 1, if claim 1 is patentable, all remaining claims must be patentable. Appellant further refers to arguments previously made within sections **A-D**.

Examiner asserts that as discussed above, claim 1 is properly rejected under 35 USC 103(a) as being unpatentable over Kim in view of Ansuini, and thus claim 1 is not patentable, along with dependent claims 2-22.

1. Appellant argues that the Examiner fails to appreciate that even the combination of the Kim and Ansuini references fail to teach Appellants' claimed combination of "at least two common terminals" and "a plurality of corrosive tracks" each of which track includes "a plurality of mutually inverted generally U-shaped bends".

Appellant points to arguments made in sections A and C, re-asserting the arguments therein. As discussed above in sections A and C, Examiner maintains that

the combination of Kim in view of Ansuini is a proper combination under 35 USC 103(a) for rejecting claim 1.

2. Appellant argues that the Examiner fails to articulate or identify any "reason" or "motivation" for combining the Kim and Ansuini references.

Appellant further argues that the Examiner's "reason," at least as expressed on page 4 (Office Action mailed 10/16/2007, re-presented in the Grounds of Rejection section), seems to relate to combining the disclosures in the Kim and Ansuini references to support a rejection of a feature in dependent claim 6, and not the independent claim 1.

The Examiner argues that as can be seen clearly from above and in the Office Action mailed 10/16/07 (re-presented in the Grounds of Rejection section), the Examiner recites "**Further, with regard to claim 1**, if the Kim device is taken to not have a plurality of mutually inverted generally U-shaped bends, it would have been obvious to modify the Kim device to include such a configuration with the plural tracks of Kim, such as taught by Ansuini, in order to save space."(Emphasis added) Examiner thereby argues that, as discussed above, and in the Grounds for Rejection and within the previous Argument sections A-E, and 1, the record clearly shows "motivation" or "reason" for combining Kim and Ansuini with respect to claim 1, and the rejection is proper under 35 USC 103(a).



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3. Appellant argues that the Examiner fails to appreciate that both Kim and Ansuini teach away from Appellant's claimed combination of elements.

Appellant reiterates arguments as presented above with respect to sections B and D.

Examiner argues that as discussed above in sections B and D, Kim and Ansuini do not teach away from the claimed combination of elements, and the rejection under 35 USC 103(a) is maintained as proper.

Claims 1-22 are maintained rejected as discussed above.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Neil Turk/

/Jill Warden/  
Supervisory Patent Examiner, Art Unit 1797

Conferees:

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